

Claims

1. A polyamide acid resin (A) containing an unsaturated group, obtained by reacting an unsaturated group-containing polyester resin (a) having a terminal anhydride group with a compound (b) having two amino groups in a molecule.
2. The polyamide acid resin (A) containing an unsaturated group according to Claim 1, wherein an unsaturated group-containing polyester resin (a) having a terminal anhydride group is a compound obtained by reacting a polyol compound (c) containing an unsaturated group with a tetrabasic acid dianhydride (d).
3. The polyamide acid resin (A) containing an unsaturated group according to Claim 2, wherein a polyol compound (c) containing an unsaturated group is a compound obtained by reacting a compound (e) having at least two glycidyl groups in a molecule with a monocarboxylic acid (f) having an ethylenic unsaturated group in a molecule.
4. The polyamide acid resin (A) containing an unsaturated group according to Claim 3, wherein a compound (e) having at least two glycidyl groups in a molecule is (1) a bisphenol-type epoxy resin, (2) a straight chain or cyclic (C2 to C10) aliphatic polyvalent glycidyl ether, provided that number of a glycidyl group is 2 to 5, and number of carbon atoms in the case of a cyclic ether is at least 3, (3) a polysulfide type diglycidyl ether, or (4) a biphenol-type diepoxy compound, and in addition, a monocarboxylic acid (f) having an ethylenic unsaturated group in a molecule is a (C3 to C6) aliphatic monocarboxylic acid containing an ethylenic unsaturated group which may be substituted with a phenyl group.

5. The polyamide acid resin (A) containing an unsaturated group according to Claim 3, wherein a compound (e) having at least two glycidyl groups in a molecule is a compound selected from a group of a phenyl diglycidyl ether compound, a bisphenol-type diepoxy compound, a hydrogenated bisphenol-type diepoxy compound, a halogenated bisphenol-type diepoxy compound, an alicyclic diepoxy compound, an aliphatic diglycidyl ether compound, a polysulfide-type diglycidyl ether compound and a biphenol-type diepoxy compound.

6. The polyamide acid resin (A) containing an unsaturated group according to Claim 4 or Claim 5, wherein a monocarboxylic acid (f) having an ethylenic unsaturated group in a molecule is (meth)acrylic acid or cinnamic acid.

7. The polyamide acid resin (A) containing an unsaturated group according to any one of Claims 2 to 6, wherein a tetrabasic acid dianhydride (d) is a tetrabasic acid dianhydride selected from a group consisting of pyromellitic dianhydride, ethylene glycol-bis(anhydrotrimellitate), glycerin bis(anhydrotrimellitate) monoacetate, 1,2,3,4-butanetetracarboxylic dianhydride, 3,3',4,4'-diphenylsulfonetetracarboxylic dianhydride, 3,3',4,4'-benzophenonetetracarboxylic dianhydride, 3,3',4,4'-biphenyltetracarboxylic dianhydride, 3,3',4,4'-diphenylethertetracarboxylic dianhydride, 2,2-bis(3,4-anhydrodicarboxyphenyl)propane, 2,2-bis(3,4-anhydrodicarboxyphenyl)hexafluoropropane, 5-(2,5-dioxotetrahydro-3-furanyl)-3-methylcyclohexene-1,2-dicarboxylic anhydride, and 3a,4,5,9b-tetrahydro-5-(tetrahydro-2,4-dioxo-3-furanyl)-

naphtho[1,2-c]furan-1,3-dione.

8. The polyamide acid resin (A) containing an unsaturated group according to any one of Claims 1 to 7, wherein a compound (b) having two amino groups in a molecule is a compound selected from a group consisting of 4,4'-diaminodiphenylmethane, 3,4'-diaminodiphenylmethane, 4,4'-diaminodiphenylether, 3,4'-diaminodiphenylether, 4,4'-diaminodiphenylsulfone, 3,4'-diaminodiphenylsulfone, 4,4'-diaminobenzophenone, and 3,4'-diaminobenzophenone.

9. The polyamide acid resin (A) containing an unsaturated group according to any one of Claims 1 to 6, wherein equivalent of an ethylenic unsaturated group of a polyamide acid resin (A) containing an unsaturated group is 300 to 2,000 g/equivalent.

10. The polyamide acid resin (A) containing an unsaturated group according to any one of Claims 1 to 8, wherein equivalent of a carboxyl group of a polyamide acid resin (A) containing an unsaturated group is 200 to 1,500 g/equivalent.

11. A method for producing a polyamide acid resin (A) containing an unsaturated group according to any one of Claims 1 to 10, characterized by reacting a polyol compound (c) containing an unsaturated group, which is a reaction product of a compound (e) having at least two glycidyl groups in a molecule and a monocarboxylic acid (f) having an ethylenic unsaturated group in a molecule, and a tetrabasic acid dianhydride (d) to yield an unsaturated group-containing polyester resin (a) having a terminal anhydride group, which is then reacted with a compound (b) having two amino groups in a molecule.

12. The method for producing the polyamide acid resin (A) containing an unsaturated group according to Claim 11, wherein a compound (e) having at least two glycidyl groups in a molecule is a bisphenol-type diepoxy compound, or a biphenol-type diepoxy compound; a monocarboxylic acid (f) having an ethylenic unsaturated group in a molecule is acrylic acid; a tetrabasic acid dianhydride (d) is pyromellitic anhydride or 3,3',4,4'-benzophenone tetracarboxylic dihydride; and a compound (b) having two amino groups in a molecule is 3,4'-diaminodiphenyl ether.

13. A photosensitive resin composition characterized by containing the polyamide acid resin (A) containing an unsaturated group according to any one of Claims 1 to 12, a crosslinker (B) and a photopolymerization initiator (C).

14. The photosensitive resin composition characterized by containing the polyamide acid resin (A) containing an unsaturated group according to any one of Claims 1 to 12, a crosslinker (B), a photopolymerization initiator (C), and a component (D) to be cured.

15. A cured product of the photosensitive resin composition according to Claim 13 or Claim 14.

16. A substrate having a layer of the cured product according to Claim 15.

17. An article having the substrate according to Claim 16.